IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

NEODRON, LTD.,	§	
	§	
Plaintiff,	§	**Case No. 6:20-cv-00212-ADA**
	§	
v.	§	
	§	
APPLE INC.,	§	
	§	
Defendant.	§	
	§	

APPLE'S OPENING CLAIM CONSTRUCTION BRIEF ON THE TERMS OF U.S. PAT. NOS. 7,821,502, 9,823,784, AND 10,146,351

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Defendant respectfully submits its opening claim construction brief for the terms of U.S. Patent Nos. 7,821,502, 9,823,784, and 10,146,351.[1]

I. INTRODUCTION

Defendant's constructions reflect what a person of ordinary skill in the art, informed by the cited intrinsic and extrinsic evidence, would understand the terms to mean. Where Defendant's constructions depart from the plain and ordinary meaning, it is only because (a) the claim term in dispute has no accepted plain and ordinary meaning, (b) the patentee acted as their own lexicographer in defining a term, or (c) the patentee defined the term by implication.

For the reasons demonstrated below, the Court should adopt Apple's constructions.

II. THE AGREED TERMS OF U.S. PATENT NO. 9,823,784

The parties have agreed to the construction below for the '784 patent.

'784 Claim Term	Agreed Construction
"pitch" (claims 1-3)	"distance from the center of one electrode to the center of an adjacent electrode"
"wherein the plurality of drive electrodes are substantially area filling within the sensing region relative to the plurality of sense electrodes" (claims 1-3)	"where the drive electrodes are substantially area filling and where the drive electrodes are more area filling than the sense electrodes"
"together, the plurality of sense electrodes and the plurality of isolated conductive elements are substantially area filling within the sensing region relative to the plurality of sense electrodes" (claims 1-3)	"where the sense electrodes and isolated conductive elements are substantially area filling and where the sense electrodes and isolated conductive elements are more area filling than the sense electrodes"

III. LEVEL OF ORDINARY SKILL IN THE ART

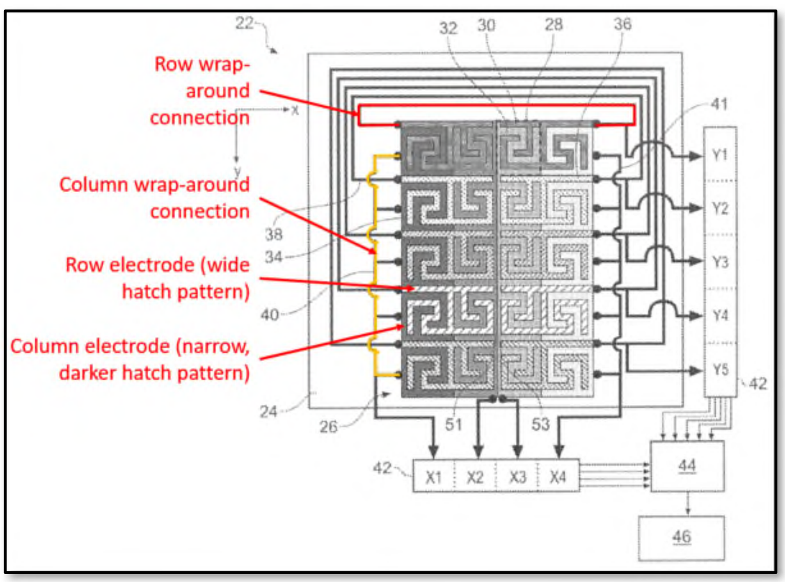
A person of ordinary skill in the art at the time of the applications of the '502 and '351 patents ("**POSITA**") would have had a bachelor's degree in electrical engineering, computer

[1] The parties do not dispute any terms in U.S. Pat. No. 9,823,784, the third patent-in-suit.

science, physics, or the equivalent, plus at least two years of experience in the field of touch sensors or a related field, where additional education could substitute for work experience and vice versa. Wolfe Decl. at ¶ 33.

IV. THE DISPUTED TERMS OF U.S. PATENT NO. 7,821,502

The ’502 patent is directed to a two-dimensional capacitive position sensor such as in a touchpad or a touchscreen. *See* ’502 patent at 1:5-17. Unlike prior art devices with strip-shaped sensing electrodes formed on opposite surfaces of a substrate (e.g., a sheet of glass or plastic) or with two sets of strip-shaped sensing electrodes formed on one surface of a substrate, the ’502 patent discloses interleaved row and column sensing electrodes formed on the same surface of a substrate in a single layer and arranged in an array. *Id*. at 1:19-33, 2:47-67. To provide both as many as four or more rows and four columns in an array, the patent discloses row and column wrap-around connections that connect electrodes at opposite ends of a respective row or column, which purportedly ensures that all electrodes in the same row or column are electrically coupled. Id. at 1:19-33, 2:47-67, 11:35-38. One embodiment of a four-column, five-row array is illustrated in annotated and color-coded Figure 3 below:



A. "sensing cells" (claims 1-2, 4-8, 11-14, 16)

Apple's Construction	Neodron's Construction
"the area whose boundaries are fixed by the portions of a column sensing electrode and a row sensing electrode at the intersection of a row and column in the array that forms the sensing area"	Plain and ordinary meaning, which is "sensing cells"

The term "sensing cells" has no plain and ordinary meaning.[2] Wolfe Decl. at ¶ 34. There is no definition of this term in any of 17 technical and non-technical dictionaries examined by Dr. Wolfe. *Id*. Moreover, those of skill in the art do not attribute any particular meaning to this term. *Id*.

Because "sensing cells" has no plain and ordinary meaning, the meaning of this term must be found in the patent and this term can be construed "only as broadly as provided for by the patent itself." *Irdeto Access, Inc. v. EchoStar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004) (citing *J.T. Eaton & Co., Inc. v. Atlantic Paste & Glue Co.*, 196 F.3d 1563, 1570 (Fed. Cir. 1997)); *Indacon, Inc. v. Facebook, Inc.*, 824 F.3d 1352, 1357 (Fed. Cir. 2016). A patent may provide an express definition of a term with no plain and ordinary meaning, or may define the term by implication by using the term in a manner consistent with only a single meaning. *Irdeto*, 383 F.3d at 1302; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir. 2005) (en banc) (citing *Irdeto* holding that specification may define claim terms by implication); *Indacon*, 824 F.3d at 1357 (relying on specification to limit scope of claim term with no plain meaning).

The '502 patent does not explicitly define a sensing cell, but does provide an implicit definition. Wolfe Decl. at ¶ 35. First, claim 1 recites "each sensing cell including a column

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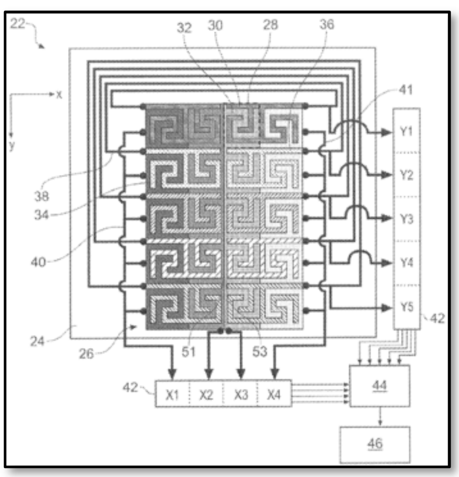
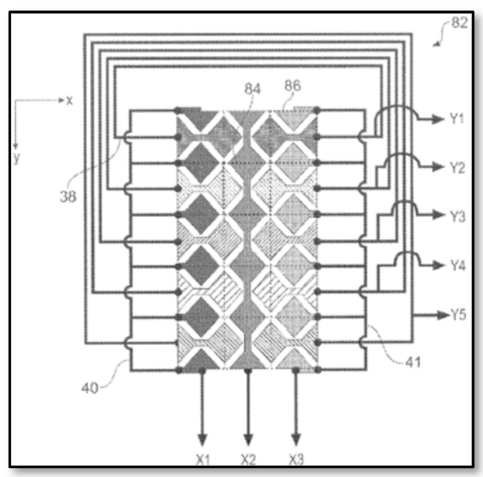
[2] The Court did not construe "sensing cells" in the Dell Case because the parties agreed to a construction of plain and ordinary meaning, which is "sensing cells." Ex. 1 (JCCS in 1:19-cv-00918) at 3.

sensing electrode and a row sensing electrode" and further recites that "the electrodes define an array of sensing cells arranged in columns and rows." '502 patent at 12:15-18. The specification indicates that a sensing cell may have different shapes including a square, a rectangle or "possibly other shapes such as trapezoids." '502 patent at 7:50-54. Each of these shapes are polygons comprised of four straight edges. Wolfe Decl. at ¶ 36. This is in accord with the recitation in claim 1 that the sensing cells form an array that is arranged in columns and rows.

The specification also discloses that every boundary of a sensing cell is co-located with the outermost portion of an electrode in the sensing cell, and that no boundary of a sensing cell is located entirely beyond the boundaries of all electrodes in that cell. Wolfe Decl. at ¶¶ 37-38. First, the specification is clear that the boundaries of a sensing cell do not extend beyond the outermost boundaries of the electrodes in that cell. Figures 3 and 8 reproduced below are the only illustrations in the '502 patent that show the relationship between sensing cells and the sensing electrodes that define them:



'502 Fig. 3



'502 Fig. 8

In both of these figures, every boundary of every sensing cell is located at the edges of the electrodes or portions of the electrodes that define the sensing cell. Sensing cell 28 of Fig. 3, illustrated by dashed lines that form a rectangle, has a top edge at the top edge of the row

electrode 30, and a bottom edge at the bottom edge of column electrode 32. Similarly, the right and left edges of sensing cell 28 are at the corresponding right and left edge of column electrode 32. There is no edge of sensing cell 28 that is not touching at an outermost edge of an electrode or portion of an electrode in that sensing cell. Similarly, every boundary of the sensing cells 84 and 86 of Fig. 8, as well as the other, non-numbered sensing cells indicated by the dotted lines in Fig. 8, touches an outermost edge of an electrode or portion of an electrode in that cell. Wolfe Decl. at ¶ 38. There is no boundary of any sensing cell in Figures 3 or 8 that is not at least partly co-located at an outermost edge of an electrode in that cell. Wolfe Decl. at ¶¶ 37-38.

Second, the specification is clear that the boundaries of a sensing cell do not extend to locations at which a sensing cell is able to sense an object. Said another way, objects which can be sensed by a sensing cell may be located outside the sensing cell. Wolfe Decl. at ¶ 39. This can be seen with reference to Figs. 5A and 5B and the accompanying discussion at 9:10-54. This passage discusses an interpolation process by which the position of a finger that touches the touch sensor of Fig. 3 at a point in column X2 and row Y3, in particular at location (x,y) = (1.8, 2.8), can be determined. ’502 patent at 9:47-48. As seen in Fig. 5A, although the finger touches the touch sensor in column X2, the finger is also sensed in columns X1, X3 and X4 as indicated by the capacitance values along the Cx axis in Fig. 5A. Similarly, although the finger touches the touchscreen in row Y3, the finger is also sensed in rows Y1, Y2, Y4 and Y5 as indicated by the capacitance values along the Cy axis in Fig. 5B. This means that the sensing cell 28, which is in column X3 and row Y1, senses the finger that touches the display in column X2 and row Y3. However, the boundary of sensing cell 28 does not extend to the point in column X2 and row Y3 where the finger touches. Wolfe Decl. at ¶ 39. Moreover, even though sensing cell 28 may be capable of sensing a finger above the illustrated dashed line boundary of sensing cell 28,

that boundary extends no further than the top of the portion of row sensing electrode 30 in that sensing cell 28. *Id*.

Every example of sensing cells in the '502 patent have boundaries that are in contact with an outermost portion of an electrode in that cell. Wolfe Decl. at ¶¶ 36-39. Nowhere does the specification contemplate a sensing cell with any boundary that lies beyond all electrodes in that cell. *Id*. Under these circumstances, the specification has defined a sensing cell by implication as having boundaries in contact with the outermost portions of electrodes in that cell. *See Irdeto*, 383 F.3d at 1301 (specification in which every example of a group is a subset of subscribers has defined group as a subset of subscribers by implication, even when those examples are permissive); *Indacon*, 824 F.3d at 1357 (construing "link" terms narrowly as "*allowing each instance* of a defined term to be identified and displayed as a link" based on repeated examples in specification) (emphasis in original).

B. "sensing area" (claims 1-2, 4-8, 11-14, 16)

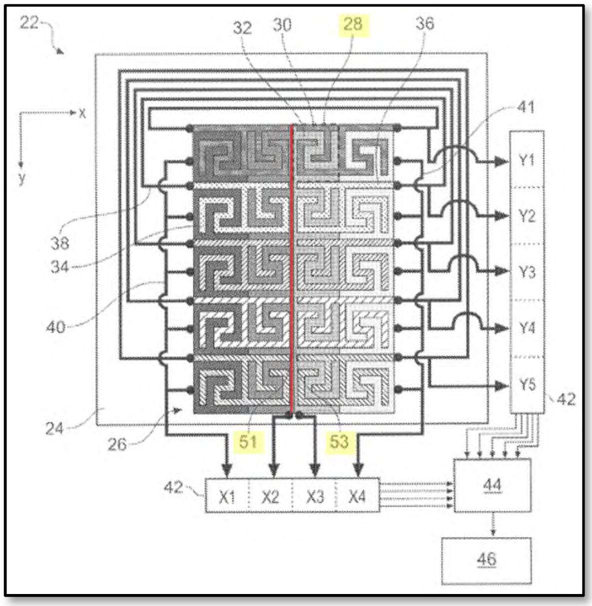
Apple's Construction	Neodron's Construction
"an area whose boundaries are fixed by the outermost edges of the sensing cells of the position sensor"	"an area defined by the sensing cells"

In case No. 1:19-cv-00819-ADA ("**Dell Case**") the Court determined that "sensing area" means "an area ***defined*** by the sensing cells." Dell Case, D.I. 100 at 2 (emphasis added). However, the briefing in that case indicates that the parties there disputed the meaning of the verb "define." *See, e.g.*, Dell Case, D.I. 66 at 16-17 (defendants relying on the definition "to determine or fix the boundaries or extent of" in Webster's New Universal Unabridged Dictionary (2003), Ex. 17) and D.I. 73 at 8-9 (Neodron relying on the definition "to make clear the outline ***or form of***," (emphasis original). During the parties' *Markman* conference, it appeared that Apple and Neodron also dispute the meaning of "define" in the context of what it means for a

sensing cell to define a sensing area. Because there is a dispute between the parties regarding the meaning of "define," the Court must resolve the dispute. *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008).

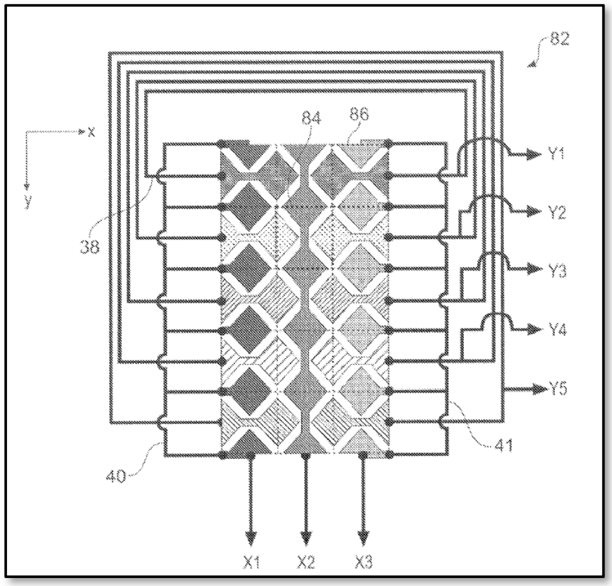
The term "sensing area" has no plain and ordinary meaning. Wolfe Decl. at ¶ 40. There is no definition of this term in any of 17 technical dictionaries examined by Dr. Wolfe. *Id*. Moreover, those of skill in the art do not attribute any particular meaning to this term. *Id*. As established above, when a term has no plain and ordinary meaning, the meaning of the term must be found in the patent, and can be construed "only as broadly as provided for by the patent itself." *Irdeto,* 383 F.3d at 1300; *Indacon,* 824 F.3d at 1357.

The specification of the '502 patent makes clear that the boundaries of the sensing cells determine or fix the boundaries of the sensing area. Said another way, the boundaries of the sensing area extend no farther than the boundaries of the sensing cell. As discussed above, the specification illustrates a sensing cell 28 located at column x3 and row y1 with a boundary indicated by a dashed line in Fig. 3. The specification further discloses that in Fig. 3 the "column sensing electrodes in column X2 are connected to one another by a connection 51, also referred to as a spine" and that "[t]his connection ***runs the length of the sensing area***." '502 patent at 6:29-33. The spine 51 is the red-shaded area in the annotated version of Fig. 3 below:



As seen in the figure, the top of the spine 51 stops exactly at the upper boundary of the sensing cell 28. Because the specification teaches that the spine 51 runs the length of the sensing area, this means that the upper boundary of the sensing cell is located at the top edge of sensing area. A POSITA would readily understand the bottom boundary of the sensing cell at column x3 and row Y5 would similarly coincide with the bottom of spine 51. Wolfe Decl. at ¶ 41. Thus, the specification teaches that the upper and lower boundaries of the sensing area are located at (i.e., are defined by) the upper and lower boundaries of the sensing cells at the top and bottom of the sensing area. Wolfe Decl. at ¶ 41.

The specification also discloses that the right and left edges of the sensing area are located at (i.e., are defined by) the right-most and left-most boundaries of the sensing cells on the right and left sides of the sensing area. In discussing the embodiment of Fig. 8, the specification refers to "***sensing cells*** in columns at the ***edge of the sensing area*** (i.e. columns x1 and x3, e.g., sensing cell 86 . . . ." '502 patent at 11:1-2 (emphasis added). The boundaries sensing cells such as sensing cell 86 are indicated by dotted lines as shown in the portion of Fig. 8 below:



Thus, the specification discloses that right boundary of sensing cell 86 in column x3 is at the right edge of the sensing area. Wolfe Decl. at ¶ 42. Similarly, the left edge of the sensing cell in the upper left-hand corner (the sensing cell at column x1, row y1) is at the left edge of the sensing area. *Id*. These disclosures are also in accordance with the recitation in claim 1 "sensing cells arranged in columns and rows to form a capacitive sensing area." '502 patent at 12:12:15-17. In contrast to these embodiments, there is no disclosure of any embodiment in the '502 patent where the sensing area extends beyond the boundaries of the sensing cells in that sensing area. Wolfe Decl. at ¶ 42.

In light of these disclosures in the specification and in the absence of any disclosure in the specification of a sensing area that extends beyond the sensing cells in it, a POSITA would understand "define" to mean "to determine or fix the boundaries or extent of" just as defendants argued in the Dell Case. Wolfe Decl. at ¶ 43. Neodron's claim construction expert in the Dell Case, Mr. Richard Flasck, agrees. In that case, Mr. Flasck repeatedly used "define" in the same way, and repeatedly indicated that the sensing area does not extend beyond the outermost boundaries of the sensing cells that make up the sensing area. Ex. 2, (Flasck decl.) at ¶ 54 ("[I]t

is those 'sensing cells' that define the disputed 'sensing area' …"); ¶ 57 ("[T]he claims consistently refer to the ***'sensing cells' that exist at and defines [sic] the boundary or 'edge' of a sensing area.***") (emphasis added); and, ¶ 58 ("In other words, the sensing cells ***define the 'edge' of the sensing area …"***) (emphasis added). Because the sensing cells exist at the edge of the sensing area, it follows that the sensing area does not extend beyond the boundaries of sensing cells. Thus, experts for both parties agree that a POSITA would understand "sensing area" to mean "an area whose boundaries are fixed by the outermost edges of the sensing cells of the position sensor."

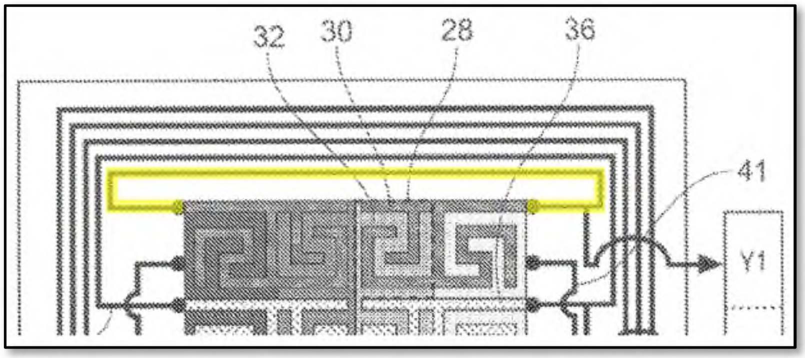
C. "wherein row sensing electrodes of sensing cells at opposing ends of at least one of the rows are electrically coupled to one another by respective row wrap-around connections made outside of the sensing area" (claims 1-2, 4-8, 11-14, 16)

Apple's Construction	Neodron's Construction
"wherein row sensing electrodes of sensing cells at opposing ends of at least one of the rows are electrically coupled to one another by respective row wrap-around connections made outside of the sensing area," where the row wrap-around connection must wrap around electrodes in the row other than the two electrodes at opposing ends of the row, but need not have any particular shape nor be connected to the ends of the two electrodes at opposite ends of the row.	"wherein row sensing electrodes of sensing cells at opposing ends of at least one of the rows are electrically coupled to one another by respective row wrap-around connections made outside of the sensing area"

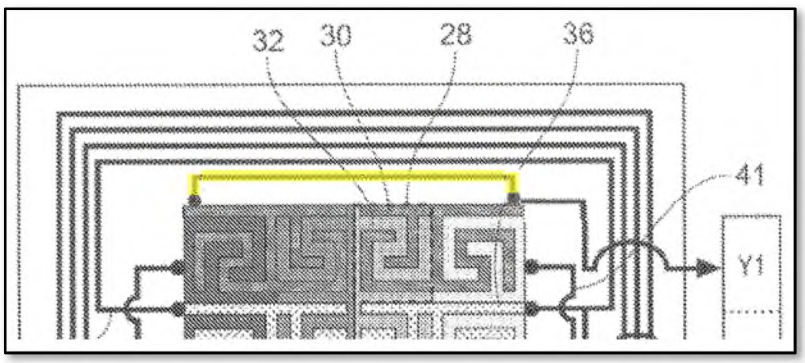
In the Joint Claim Construction Statement submitted by the parties in the earlier Neodron litigation, Neodron stated that "[b]ased on Defendants' claim construction briefing, Neodron no longer believes there is any meaningful dispute between the parties on the plain meaning of this term." Ex. 1 at 6. Taking Neodron at its word, this means that Neodron does not dispute the following issues raised in the Dell defendants' briefing:

First, the Dell defendants' briefing asserted that the row wrap-around connections are not limited to connections that wrap around ***from the ends*** of row sensing electrodes at opposite ends

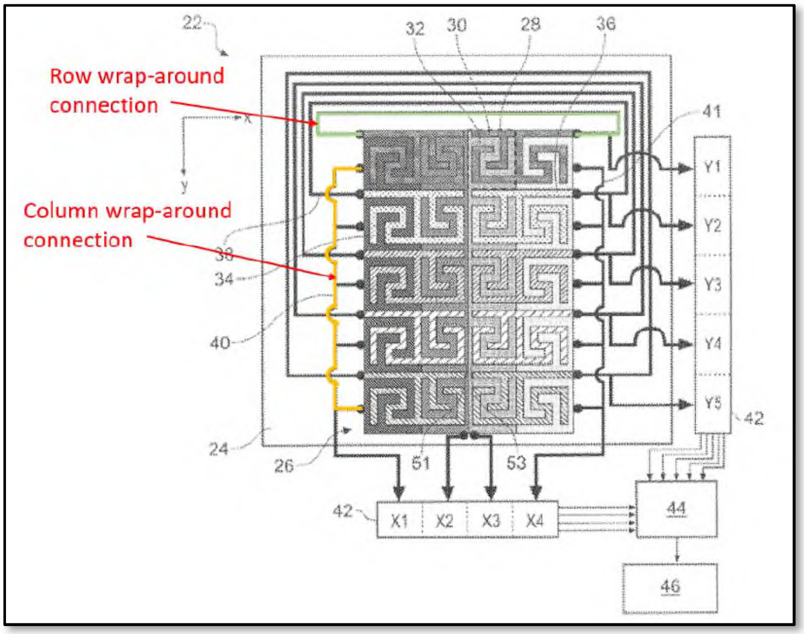
of the row such as the yellow-highlighted wrap-around connection from the annotated excerpt from Fig. 3 of the '502 patent shown below (*see also* Ex. 5 at 22-24):



Rather, row wrap-around connections may have different shapes, and may be connected to a part of the row sensing spaced apart from the ends of the row sensing electrodes at opposite ends of a row, as illustrated by the yellow-highlighted row wrap-around connection in the hypothetical figure below taken from the Dell Defs' Reply Brief (Ex. 5) at 22-24:



Second, the Dell defendants' briefs contested Neodron's assertion that the yellow-highlighted connector 40 shown in the annotated excerpt from Fig. 3 below is a wrap-around connection (i.e., a column wrap-around connection) as discussed in the Dell Defs' Opening Brief (Ex. 3) at 33-34 and in Dell Defs' Responsive Brief (Ex. 4) at 27-28:

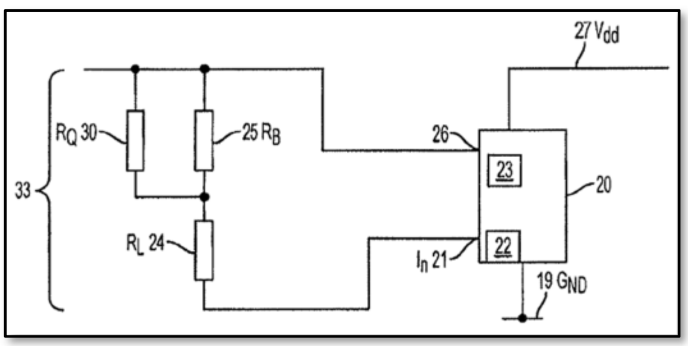


Third, the Dell defendants argued that this limitation did not require the row wrap-around connection to wrap around the sensing area, but instead required the wrap-around connection to wrap around electrodes in the row other than the two electrodes at opposing ends of the row. Ex. 4 (Dell Defs' Responsive Brief) at 24-30 and Ex. 5 (Dell Defendants' Reply Brief) at 19-24.

Given that Neodron has represented to this Court that it no longer disputes these points in the Dell defendants' briefing, Apple's construction makes explicit that wrap-around connections are not limited to the particular shape of the green-highlighted row-wrap around connections of Fig. 3 and need not have any particular shape, need not be connected to the *ends* of row sensing electrodes at opposite ends of a row, and need only wrap around the sensing electrodes other than the row sensing electrodes at opposite ends of the row rather than wrap around the sensing area, should be adopted. Moreover, in light of its earlier representation to the Court in the Dell Case, the Court should expressly preclude Neodron from arguing that the connector 40 of Fig. 3 of the '502 patent is not a wrap-around connection.

V. THE DISPUTED TERMS OF U.S. PATENT NO. 10,146,351

The ’351 Patent is directed to an apparatus that determines the amount of force applied to a “touch sensing panel.” ’351 Patent at claim 1. Claim 1 (the only independent claim) recites a “control unit” that includes a “voltage driver and integrator circuit.” *Id.* at claim 1. A “touch sensing panel” is “operable to communicate with the control unit” and a “variable resistance element” is “coupled to an output of the voltage driver and an input of the integrator circuit.” The voltage driver is “operable to provide an alternating voltage,” and the integrator circuit is “operable to measure a parameter of the first variable resistance element over a period of time.” Additional “circuitry” is “operable to determine, based on the measured parameter, an amount of force applied to [the sensor].” *Id.* Figure 4 illustrates an exemplary embodiment (omitting the “touch sensing panel”):



Id., at Fig. 4. As shown in Figure 4, voltage driver output 26 provides an alternating voltage to resistive force sensitive element 30 (with variable resistance “R_Q”), and the resulting current is measured by current integrator 22. *Id.* at 5:56-6:12.

A. “a bias resistance element connected in parallel with the first variable resistance element” (claim 3) and “a bias resistance element connected in parallel with the second variable resistance element” (claim 6)

Apple’s Construction	Neodron’s Construction
“a non-variable resistance element connected in parallel with the first variable resistance element that provides a current path to the	Plain and ordinary meaning, which is “bias

input of the integrator if the first variable resistance element has a very high value" (claim 3), and "a non-variable resistance element connected in parallel with the second variable resistance element that provides a current path to the input of the integrator if the second variable resistance element has a very high value" (claim 6)	resistance element connected in parallel with the first variable resistance element."

Apple's construction of the "bias resistance element" limitation correctly reflects how the patentee uses the term "bias resistor" throughout the entire specification and because the patentee's use is consistent with only a single meaning. "The specification acts as a dictionary 'when it expressly defines terms used in the claims or when it defines terms by implication.'" *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[W]hen a patentee uses a claim term throughout the entire patent specification, in a manner consistent with only a single meaning, he has defined that term 'by implication.'" *Bell Atl.*, 262 F.3d at 1270 (citing *Vitronics Corp.*, 90 F.3d at 1582); *see also Arista Networks, Inc. v. Cisco Systems, Inc.*, 908 F.3d 792, 796-97 (Fed. Cir. 2018). The '351 patent uses the term "bias resistor" in a manner that is consistent with only the single meaning Apple proposes and the patent does not describe or enable any other "bias resistance element."

In all preferred embodiments, a "bias resistor" "is connected between either a fixed voltage supply rail (Fig. 3) or a voltage driver (Figs. 4 and 5) and the limit resistor (if any) in parallel with the resistive force sensitive element, and the bias resistor "provides a DC current path if the resistance of the resistive force sensitive element 30 rises to a very high value." '351 patent at 5:11-18 (in the context of Fig. 3); *see also* at 6:44-46 (in the context of Fig. 4) and 7:22-29 (in the context of Fig. 5). The '351 patent also discloses that such a bias resistor need not be used in an embodiment if the resistive force sensitive element's resistance "is sufficiently low

that a DC current path through the resistive force sensitive element exists." '351 patent at 7:65-8:2. A POSITA would understand that those "bias resistors" are the only disclosure in the '351 patent that possibly describe and enable the "bias resistance element" recited in claims 3 and 6. Wolfe Decl. at ¶ 44.

Other than in claims 3 and 6 ("bias resistance element") and the passages cited above ("bias resistor"), the '351 patent uses the word "bias" only one other time and in a context unrelated to any resistance element when it passingly lists "bias networks" as one of several types of "dedicated electronic conditioning circuitry." '351 patent at 4:40-44.

Apple's construction is correct because it is consistent with how the patentee uses the term throughout the entire patent and in a manner consistent with only the single meaning Apple proposes. *Bell Atl.*, 262 F.3d at 1270 and *Arista Networks*, 908 F.3d at 796-97.

B. "a limiting resistance element connected in series with the first variable resistance element" (claim 4) and "a limiting resistance element connected in series with the second variable resistance element" (claim 7)

Apple's Construction	Neodron's Construction
"a non-variable resistance element connected in series with the first variable resistance element that limits the maximum current flow through the first variable resistance element to the input of the integrator circuit" (claim 4), and "a non-variable resistance element connected in series with the second variable resistance element that limits the maximum current flow through the second variable resistance element to the input of the integrator circuit" (claim 7)	Plain and ordinary meaning, which is "a limiting resistance element connected in series with the first variable resistance element."

Like the "bias resistance element" limitation, Apple's construction of the "limiting resistance element" limitation correctly reflects how the patentee uses the term "limit resistor" throughout the entire specification and because the patentee's use is consistent with only a single meaning. *Bell Atl.*, 262 F.3d at 1270 and *Arista Networks*, 908 F.3d at 796-97.

In all preferred embodiments, a "limit resistor" "is connected in series with the resistive force sensitive element 30, between the fixed voltage supply rail 27, and the current integrator input 21" and "limits the maximum current flow through the resistive force sensitive element 30 to the current integrator input 21." '351 patent at 4:65-5:6 and 5:11-13 (in the context of Fig. 3); *see also* 6:40-46 (in the context of Fig. 4) and 7:22-29 (in the context of Fig. 5). The '351 patent also discloses that such a limit resistor need not be used in an embodiment "if the characteristics of the resistive force sensitive element 30 are such that the resistance of the resistive force sensitive element is sufficiently high that the maximum current flow through the resistive force sensitive element is acceptable to the current integrator 22" or "if the current integrators 22 include an integral limit resistor." '351 patent at 7:55-63. A POSITA would understand that those "limit resistors" are the only disclosure in the '351 patent that possibly describe and enable the "limit resistance element" recited in claims 4 and 7. Wolfe Decl. at ¶ 45.

Other than in claims 4 and 7 ("limit resistance element") and the passages cited above ("limit resistor"), the '351 patent uses the word "limit" only in contexts unrelated to any resistance element.

Apple's construction is correct because it is consistent with how the patentee uses the term throughout the entire patent and in a manner consistent with only the single meaning Apple proposes. *Bell Atl.*, 262 F.3d at 1270 and *Arista Networks*, 908 F.3d at 796-97.

C. "circuitry operable to determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel" (claims 1-10)

Apple's Construction	Neodron's Construction
Plain and ordinary meaning, which is "electrical hardware, not software, to determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel"	Plain and ordinary meaning, which is "circuitry operable to determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel."

Alternatively: “circuitry” is a nonce word subject to § 112 ¶ 6. Function: determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel. Structure: (a) simple threshold on the output of the integrator, (b) control unit 20 performing the algorithm at 5:20-33, (c) control unit 20 performing the algorithm at 6:48-55, or (d) control unit 20 performing the algorithm at 7:30-39 and equivalents thereof	Alternatively, if this term is subject to § 112 ¶ 6. Function: determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel. Structure: (a) simple threshold at the output of the integrator; (b) control unit 20; (c) circuit 32; (d) circuit 33; or (e) circuit 34, and equivalents thereof

“Circuitry” is entitled to its plain and ordinary meaning in the context of the patent, which is electrical hardware, not software. Under this plain and ordinary meaning, this limitation recites structure sufficient to perform the claimed function, and no further construction of the broader claim phrase is necessary. Wolfe Decl. at ¶¶ 46-49. In the alternative, “circuitry” is a nonce word for anything that performs the recited function, including software. Wolfe Decl. at ¶¶ 50-55. In that case, the broader phrase should be construed pursuant to Section 112 ¶ 6 to be limited to the disclosed corresponding structures and equivalents thereof.

1. “Circuity” is Entitled to its Ordinary Meaning of “Electronic Hardware, Not Software”

“Circuitry” is entitled to its ordinary meaning when read in the context of the specification and prosecution history. *Thorner v. Sony Computer Entertainment America LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012), *citing Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). The ordinary meaning of “circuitry” in the context of the ’351 patent is electrical hardware, not software. Wolfe Decl. at ¶ 46.

The specification uses “circuitry” according to its ordinary meaning to refer to electrical hardware, not software. For example, the specification refers to “electronic conditioning

circuitry such as bias networks, amplifiers, analogue to digital converts, and the like." '351 patent at 4:42-44. The specification refers to each of Figures 3-5 as "a circuit diagram" and those figures diagram electronic hardware, e.g., variable and fixed resistors, not software. '351 patent at Figs. 3-5, 7:61-63 ("Further, limit resistors 26 may not be used in the illustrated circuits if the current integrators 22 include an integral limit resistor."). The specification describes discrete "current integrator circuits" within control unit 20 as "circuitry" that can be repurposed for use in force sensing. *See, e.g.*, '351 patent at Abstract, 4:32-40. The configuration of the "circuitry" allows it to be "referenced to the voltage supply rail 27," and perform "ratiometric" measurements to account for "unintended fluctuations" in the supply rail voltage. '351 patent at 4:55-64. The discussion of "circuitry" in terms of physical configurations, analog voltages and measurements confirms that "circuitry" is being used to refer to electrical hardware, and not software that merely operates on information. Wolfe Decl. at ¶ 46.

The specification never states or implies that "circuitry" is being used as a nonce word or is otherwise capable of encompassing software. For example, the specification separately recites "components and/or circuitry" making clear that "circuitry" does not refer to just any "component" of a device. '351 patent at 2:17-22. Moreover, the specification never mentions software at all. The specification does state in passing that controller 20 can include a processor 23. '351 patent at 3:67. But the specification never describes any function performed by processor 23. And that isolated reference to a processor only serves to highlight that "circuitry" is used throughout the specification according to its ordinary meaning to refer only to electrical hardware. Wolfe Decl. at ¶ 47.

The file history also supports Apple's construction. During the prosecution of related U.S. Patent Application No. 12/959,166, in response to an objection by the Examiner, the

Application argued "The term 'circuitry' would be clear to one of ordinary skill in the art." Ex. 6 (Amendment dated Feb. 19, 2013) at 8. Applicant's argument confirms that "circuitry" should be given its ordinary meaning in the art, as set forth above. Wolfe Decl. at ¶ 48.

The extrinsic evidence, including relevant technical and non-technical dictionaries, establish that the ordinary meaning of "circuitry" is electrical hardware, not software. *See, e.g.*, Ex. 7 (*Engineering Circuit Analysis* (7th Ed., 2007)) at pp. 9-23 (describing "Basic Components and Electric Circuits," e.g., at pp. 21-22 defining a "network" as an "interconnection of two or more simple circuit elements"; defining a "circuit" as a network with "at least one closed path"; defining active and passive networks; and defining a "circuit element"); Ex. 8 (*Engineering Circuit Analysis* (4th Ed., 1986)) at pp. 17-21 (disclosing substantially the same as in the 7th edition); Ex. 9 (*The IEEE Standard Dictionary of Electrical and Electronics Terms* (6th Ed. 1996)) at pp. 156-58 (not defining "circuitry" but defining "circuit" as "(**7**)(**A**) An arrangement of interconnected components that has at least one input and one output terminal, and whose purpose is to produce at the output terminals a signal that is a function of the signal at the input terminals. *Synonyms*: network; physical circuit. (**B**) An arrangement of interconnected electronic components that can perform specific functions upon application of proper voltages and signals."); Ex. 10 (*Dictionary of Computing* (6th Ed., 2010-11)) at p. 63 (no definition of "circuitry" but defining "circuit" as "a connection between the electronic components that perform a function"); Ex. 11 (*Introduction to Electric Circuits* (8th Ed., 2010)) at pp. 1-4 (*e.g.*, at p. 2: defining "electric circuit" as "an interconnection of electrical elements linked together in a closed path so that electric current may flow continuously"); Ex. 12 (*Linear Circuits* (1960)) at pp. 2-4 (describing the stimulus and response relationship of a circuit or network); and, Ex. 13 (*Circuits* (2010)) at pp. 1-3 (*e.g.* at p. 3, defining "Circuit" based on Webster's English

Dictionary); Ex. 14 (*New Oxford American Dictionary* (3rd Ed., 2010) at pp. 314-15 (defining "circuity," e.g., "a circuit or system of circuits performing a particular function in an electronic device"; and, "circuit," e.g., "**3** a complete and closed path around which a circulating electric current can flow. ■ a system of electrical conductors and components forming such a path") and Ex. 15 (*Merriam-Webster's Collegiate Dictionary* (11th Ed., 2009)) at p. 224 (defining "circuitry" as "**1 :** the detailed plan or arrangement of an electric circuit **2 :** the components of an electric circuit" and "circuit" as "**4 a :** the complete path of an electric current including usu. the source of electric energy **b :** an assemblage of electronic elements"). Wolfe Decl. at ¶ 49. Notably, other than a boilerplate reference to the potential testimony of multiple experts, Neodron failed to identify any extrinsic evidence in support of its position in its disclosures in this litigation.

Consistent with the extrinsic evidence cited above, the Federal Circuit has cited similar technical references and non-technical dictionaries when considering whether "circuit or "circuitry" connote sufficient structure. *See, e.g.*, *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004) (quoting the definition of "circuit" in *The Dictionary of Computing* at p. 75 (4th ed.1996) ("the combination of a number of electrical devices and conductors that, when interconnected to form a conducting path, fulfill some desired function") and *Modern Dictionary of Electronics* at p. 116 (7th ed.1999) ("[t]he interconnection of a number of devices in one or more closed paths to perform a desired electrical or electronic function"); *MIT v. Abacus Software*, 462 F.3d 1344, 1355 (Fed. Cir. 2006) (quoting *Webster's Third New International Dictionary* (1968 ed.) at pp. 408–09 (defining "circuit" as "the complete path of an electric current including any displacement current" and "circuitry" as "the detailed plan of an electric circuit or network (as of a radio or television receiver)") and the references

cited in *Linear Tech*, 379 F.3d at 1320); and, *Apex Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1373 (Fed. Cir. 2003) (citing the same *Dictionary of Computing*, 75 (4th ed.1996), definition from *Linear Tech*).

Thus, the intrinsic and extrinsic evidence establish that "circuitry" is not a nonce word and is entitled to its ordinary meaning of electrical hardware, not software.

2. Alternatively, "Circuity" is a Nonce Word Subject to Section 112 ¶ 6

To the extent the Court finds that "circuitry" is broad enough to encompass software, then "circuitry" is a nonce word for any component that performs the claimed function. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1350 (Fed. Cir. 2015); Wolfe Decl. at ¶ 50. The parties agree that, if the phrase is construed under Section 112 ¶ 6, the claimed function is "determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel." The specification discloses and links only four corresponding structures that satisfy the relevant case law. *B. Braun Medical Inc., v. Abbott Laboratories*, 124 F.3d 1419, 1424 (Fed. Cir. 1997) (holding disclosed structure is only corresponding structure if the intrinsic record "clearly links or associates that structure to the function").

First, the specification discloses that the claimed function can be performed using "a simple threshold on the output of the integrator." '351 patent at 5:33-37. The specification clearly links a simple threshold to the claimed function by explaining that it could be used for applications where "the force applied may not need to be accurately calculated." *Id.* A POSITA would have understood that because the integrator is integrating the current from the QTC resistor, which current is directly proportional to the applied force, a simple threshold of the amount of integrated current would provide a rough estimate of applied force and "provide information to the host system." *Id.*; Wolfe Decl. at ¶ 51.

Second, the specification discloses that control unit 20 performing one of the algorithms at 5:20-33, 6:48-55, or 7:30-39 performs this function. In the specification, the integrator circuits inside the control unit 20 measure the parameter (current) flowing through the QTC material. *See, e.g.*, '351 patent at 4:33-5:21. Because the integrator circuits are internal to control unit 20 and there is no disclosed way to communicate the measured parameter to any external component, a POSITA would have understood that control unit 20 must be the structure that performs the claimed function. But control unit 20 is merely a black box that, by itself, is insufficient structure on its own to perform the claimed function. *See, e.g., Core Wireless Licensing, S.A.R.L v. Apple*, 6:12-cv-00100-LED-JDL Document 263 (August 7, 2014) at 10-11 (holding that *WMS Gaming's* algorithm requirement applied to "control unit 803") (check history); Order 13: Construing Terms of the Asserted Patents, *In the Matter of Certain Access Control Systems and Components Thereof*, Inv. No. 337-TA-1016 at 48 (January 26, 2017) (holding "controller" can be any generic structure that can perform control functions and, as such, required algorithms to serve as structure). Additionally, the specification does not disclose or link control unit 20 to the claimed function, except by implication through the disclosed algorithms. Excluding the disclosed algorithms from the structure would not only render the control unit 20 insufficient structure, it would break the only implicit link in the specification to the control unit 20 as potential structure at all. Thus, the structure is properly limited to a control unit 20 that performs at least one of the three disclosed algorithms. Wolfe Decl. at ¶¶ 52, 54.

The first algorithm includes a first step of calculating the resistance of the QTC material from the measured current, and then a second step of calculating the force applied to the QTC material from that resistance. '351 patent at 5:20-33. These are simple conversions that a POSITA would have known how to implement. For example, the specification explains that the

equation at column 5, lines 20-22, can be used to calculate the resistance from the measured current. '351 patent at 5:20-33. And a POSITA would have known how to calculate the applied force from the resistance of the QTC material, because a POSITA would have known that the resistance of QTC material is inversely proportional to the applied force. The second algorithm is similar to the first algorithm, but uses a differential measurement. '351 patent at 6:48-55. The third algorithm is similar to the second algorithm, but determines the force applied to three different QTC force sensors, one at a time. '351 patent at 7:30-39. The description of these algorithms would have been sufficient for a POSITA to implement them. *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376 (Fed. Cir. 2011); Wolfe Decl. at ¶ 53.

In contrast, each of the alternative structures proposed by Neodron fails as a matter of fact or law. Neodron proposes "control unit 20," but without an algorithm control unit 20 is not sufficient structure. *Noah Systems Inc. v. Intuit Inc.*, 675 F.3d 1302, 1312 (Fed. Cir. 2012); *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008). The claimed function is not a trivial function like "storing" that invokes an exception to that normal rule. *Cf. In re Katz Interactive Call Processing Patent Litigation*, 639 F.3d 1303, 1316 (Fed. Cir. 2011). Moreover, without the disclosed algorithms, the specification does not disclose or link the control unit 20 to the claimed function. Wolfe Decl. at ¶¶ 52, 54.

Neodron also identifies (c) circuit 32; (d) circuit 33; or (e) circuit 34, which are the circuits disclosed in Figures 3-5, respectively, and that are "useable together with" and "communicate with" the control unit 20. '351 patent at 2:6-7 ("FIG. 3 is a circuit diagram of a first example of a force sensor useable together with the controller of a touch sensor."), 2:8-12 (same for Figures 4 and 5), 4:47-8 ("The circuit 32 is in communication with an input of a current integrator 22 of the control unit 20."), 5:58-59 (same for circuit 33), 6:57-59 (same for

circuit 34). The specification does not disclose that any of circuits 32, 33, or 34 perform the claimed function. The specification discloses that circuits 32, 33 and 34 are driven by a voltage and the resulting current is measured by the integrator circuit. *See, e.g.,* '351 patent at 5:62-6:12. Similarly, claim 1 specifies that the integrator circuit measures the parameter. '351 patent at 8:55-57 (claim 1) ("wherein the integrator circuit is operable to measure a parameter of the first variable resistance element over a period of time"). Circuits 32, 33 and 34 have no access to the measured parameter and, thus, cannot determine a force based on the measured parameter as claimed. Wolfe Decl. at ¶ 55.

D. "wherein the circuitry is operable to determine an amount of force applied to the sensing area using a differential measurement" (claim 9)

Apple's Construction	Neodron's Construction
Plain and ordinary meaning, which is "wherein the electrical hardware, not software, to determine an amount of force applied to the sensing area using a differential measurement" Alternatively: "circuitry" is a nonce word and subject to § 112 ¶ 6. Function: determine an amount of force applied to the sensing area using a differential measurement Structure: (a) control unit 20 performing the algorithm at 6:48-55 or (b) control unit 20 performing the algorithm at 7:30-39 and equivalents thereof	Plain and ordinary meaning, which is "wherein the circuitry is operable to determine an amount of force applied to the sensing area using a differential measurement." Alternatively, if this term is subject to § 112 ¶ 6. Function: determine, based on the measured parameter, an amount of force applied to a sensing area of the touch sensing panel. Structure: (a) control unit 20; (b) circuit 33; or (c) circuit 34, and equivalents thereof

"Circuitry" in claim 1 provides the antecedent basis for "the circuitry" in claim 9 and, thus, the Court should construe "the circuitry" in claim 9 consistently with its construction of "circuity" in claim 1. '351 patent at 8:60 (claim 1 reciting "circuitry operable to"), 9:19-20 (claim 9, reciting "the circuitry operable to"); Ex. 16 (Response dated May 15, 2018 at 6)

(arguing that "circuitry" in pending claim 28 (issued claim 1) provides the antecedent basis for "the circuitry" in pending claim 36 (issued claim 9) in order to overcome a rejection under Section 112). Wolfe Decl. at ¶ 56.

To the extent the Court finds "circuitry" subject to construction under Section 112, sixth paragraph, the Court should find that the claimed function is "determine an amount of force applied to the sensing area using a differential measurement" and that the corresponding structure is control unit 20 performing the algorithm at either 6:48-55 or 7:30-39. Of the four different disclosed corresponding structures that perform the function of claim 1 as discussed above, only the algorithms at 6:48-55 and 7:30-39 satisfy the additional limitation in claim 9 of "using a differential measurement." *See* '351 patent at 6:48-55 ("differential current measurement"), 7:32 (same); Wolfe Decl. at ¶ 57.

The Court should reject Neodron's proposed structures for the reasons provided with respect to "circuitry" in claim 1, and for the additional reason that none of those structures perform the additional function of "using a differential measurement" required by claim 9. Wolfe Decl. at ¶ 58.

VI. CONCLUSION

For the above reasons, Defendant requests that its proposed constructions be adopted.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that the foregoing document was electronically filed on October 23, 2020, pursuant to Local Rule CV-5(a), and has been served on all counsel whom have consented to electronic service. Any other counsel of record will be served by first class U.S. mail on this same date.

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